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# Description of the male of *Erromyrma* Bolton & Fisher, 2016 (Hymenoptera, Formicidae)

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## Abstract

The male of the myrmicine genus *Erromyrma* is described for the first time on the basis of two specimens of *Erromyrma latinodis* (Mayr, 1872) collected in northern Madagascar. We used COI barcoding to confirm the identification of the male specimens as conspecific with *Erromyrma latinodis*. We provide an illustrated male-based key to the four Myrmicinae tribes (Attini, Crematogastrini, Solenopsidini, Stenammini) and to the Solenopsidini genera (*Adelomyrmex*, *Erromyrma*, *Solenopsis*, *Syllophopsis* and *Monomorium*) for the Malagasy region.

## Keywords

*Erromyrma*, Madagascar, male ants, morphology, Myrmicinae, Solenopsidini

## Introduction

Within the Malagasy region, Myrmicinae is one of the largest and most diverse subfamilies of Formicidae (Hymenoptera), with 30 genera in four tribes (Fisher and Peeters 2019; Fisher 2022). The genus *Erromyrma* Bolton & Fisher, 2016 (Solenopsidini), is represented by one species in the Malagasy region, *Erromyrma latinodis* (Mayr, 1872).

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The species has been introduced in many countries, including the Malagasy region, and is thought to have originated in India (Sharaf et al. 2018). The global distribution also includes Indomalaya, the Southeastern Palearctic and Oceania bioregions. *Erromyrma latinodis* was originally placed in *Monomorium* but was shown to be a distinct lineage within the Solenopsidini based on molecular phylogenetic evidence (Ward et al. 2015) and placed in the newly described genus *Erromyrma*. Here we present the first description of the previously unknown male of *Erromyrma* based on *E. latinodis*, collected in northern Madagascar. We provide a male-based key to the Myrmicinae tribes and to genera for the tribe Solenopsidini of the Malagasy region.

## Material and methods

This study is based on two male ant specimens (unique specimen identifiers: CASENT0788835 and CASENT0801166) collected in northern Madagascar in the town of Antsohihy (-14.89385, 47.98261) in the Region of Sofia, at c. 11 m above sea level on April 23, 2017, by Brian L. Fisher and the Madagascar Biodiversity Center team (Team Vitsika). Two males along with workers and queens were collected by hand under the bark of a mango tree along a dirt road 1 km outside of the town of Antsohihy (collection code identifiers: BLF40204, BLF40205). The mango tree was 1.5 m in diameter and approximately 5 m tall. The ants were found under bark flakes before the first branch at about 1 m in height.

Terminology for general morphology follows Bolton (1994) and Boudinot (2013, 2015). The terminology of the wing venation follows Yoshimura and Fisher (2007). When referring to the presence or absence of veins in the descriptions, a vein is considered present regardless of whether it is tubular, nebulous, or spectral (Mason 1986).

### Imaging

Digital color montage images were created using a JVC KY-F75 digital camera and Syncroscopy Auto-Montage software (ver. 5.0), or a Leica DFC 425 camera in combination with the Leica Application Suite software (ver. 3.8). These images are available online through AntWeb.org (2022) and are accessible using the unique specimen identifier code.

### Mapping

The distribution map was generated by importing specimen distribution records into the Diva-GIS program (Hijmans et al. 2011).

### Morphological study

Morphological observations and measurements were carried out under Leica stereoscopic microscopes (MZ9.5). All measurements (see Fig. 1) and indices are expressed in millimeters.

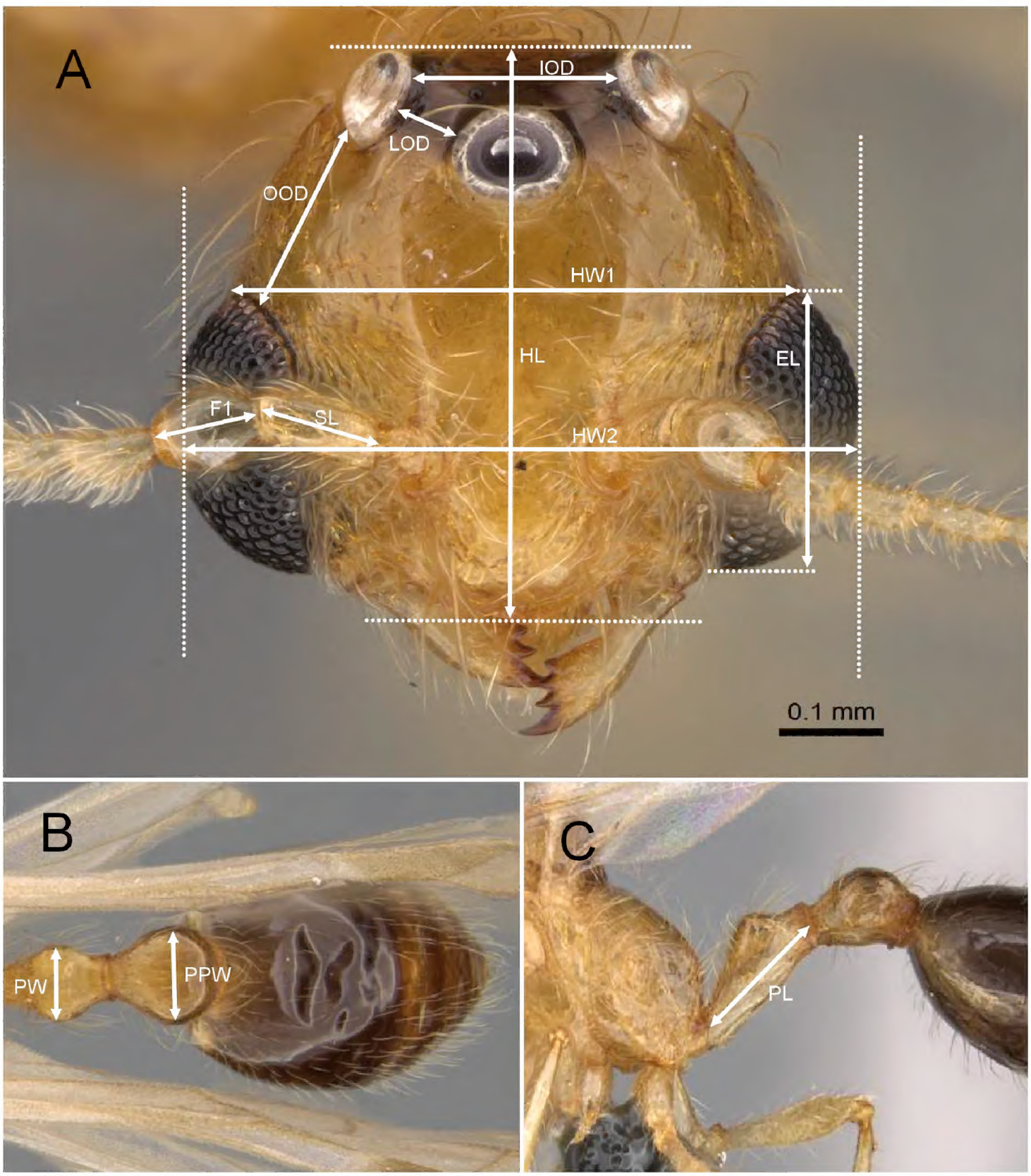


**Figure 1.** Illustration of measurements of *Erromyrma latinodis* (CASENT0788835) **A** head in full-face view **B** segment abdominal in dorsal view **C** segment abdominal in lateral view.

The following characters were recorded:

**EL:** Maximum eye length measured in full-face view along its maximum vertical diameter.

**F1:** Maximum length of the pedicel (1st funicular segment, 2nd antennal segment) measured in a straight line.

**HL:** Maximum head length in full-face view, measured in a straight line, from the anterior clypeal margin to the midpoint of a straight line drawn across the occipital margin.

**HW1:** Head width at the level of the posterior margin of compound eyes, measured in full-face view.
**HW2:** Maximum head width including the compound eyes, measured in full-face view.
**IOD:** Inner ocellar distance. Minimum distance between the inner edges of the two lateral ocelli, measured in full-face view.
**LOD:** Lateral ocellar distance. Minimum distance between the inner edge of the median and lateral ocelli, measured in full-face view.
**OOD:** Ocular-ocellar distance. Minimum distance from the outer edge of a lateral ocellus to the compound eyes, measured in full-face view.
**PL:** Petiole length, measured in profile view from the anterior margin of the peduncle to posterior most point of the petiolar tergite.
**PW:** Petiolar width. Maximum petiole width, measured in dorsal view.
**PPW:** Postpetiolar width. Maximum postpetiole width, measured in dorsal view.
**SL:** Scape length. Maximum length of the antennal scape measured in a straight line, excluding the basal constriction and condylar bulb.

## Indices

**CI:** Cephalic index. HW1/HL × 100.
**SI:** Scape index. SL/HW1 × 100.
**EI:** Eye index. EL/HW1 × 100.
**PI:** Petiolar index. PL/PPL.

## DNA sampling

After searching for the males in colonies across Madagascar for six years, we wanted to confirm that these males did represent the first males of *E. latinodis* even though they were collected along with queens and workers. We sequenced 658 base pairs (bp) of mitochondrial cytochrome oxidase I (COI) gene from one of the males to evaluate similarity with CO1 sequenced from 33 workers of *E. latinodis* across the region. The distribution of the specimens sequenced is shown in Fig. 10. DNA extraction and COI sequencing were performed at University of Guelph (Ontario, Canada), following the protocol described in Fisher and Smith (2008).

Abbreviation of depositories:

**BMNH** British Museum of Natural History, London, UK;
**CASC** California Academy of Sciences, San Francisco, CA, USA;
**MCZ** Museum of Comparative Zoology Cambridge, MA, USA;
**MHNG** Muséum d'histoire naturelle, Genève, Switzerland;
**MSNG** Museo Civico di Storia Naturale 'Giacomo Doria', Genova, Italy;
**NHMW** Naturhistorisches Museum, Wien (= Vienna), Austria.

## Results

The 34 specimens sequenced (see Table 1) had a within-species sequence divergence of 0.00%. Thus, based on CO1, the male specimen sequenced is conspecific with the workers from throughout the region.

**Table 1.** *Erromyrma latinodis* Specimens sequenced for mitochondrial cytochrome oxidase I (COI) gene, including Genbank accession number, and caste. All voucher specimens are housed at the California Academy of Sciences.

| Specimen Identifier | Collection Event identifier | BOLD Process ID | COI-5P GenBank | sequence length | Country | Caste |
|---|---|---|---|---|---|---|
| CASENT0010900-D01 | R.J.1.765 | ASANR501-09 | HQ925412 | 590 | Mayotte | worker |
| CASENT0107528-D01 | BLF11668 | JDWAM495-05 | OP442963 | 654 | Madagascar | worker |
| CASENT0107541-D01 | BLF11664 | JDWAM503-05 | OP442956 | 654 | Madagascar | worker |
| CASENT0123018-D01 | BLF16532 | ASANP672-09 | GU710443 | 596 | Madagascar | worker |
| CASENT0123025-D01 | BLF16539 | ASANP673-09 | GU710442 | 625 | Madagascar | worker |
| CASENT0123498-D01 | BLF16507 | ASANP676-09 | HQ925385 | 618 | Madagascar | worker |
| CASENT0132440-D01 | BLF18832 | ASANO176-09 | GU709833 | 658 | Mayotte | worker |
| CASENT0134112-D01 | BLF19142 | ASANP692-09 | GU710444 | 658 | Madagascar | worker |
| CASENT0134329-D01 | BLF19879 | ASANO717-09 | GU709835 | 658 | Comoros | worker |
| CASENT0134937 | BLF18804 | ASIMB817-09 | OP442961 | 654 | Mayotte | worker |
| CASENT0134955 | BLF18810 | ASIMB824-09 | OP442957 | 654 | Mayotte | worker |
| CASENT0134970 | BLF18809 | ASIMB832-09 | OP442962 | 654 | Mayotte | worker |
| CASENT0136510-D01 | BLF19801 | ASANO766-09 | GU709838 | 658 | Comoros | worker |
| CASENT0136519-D01 | BLF19811 | ASANO769-09 | GU709837 | 658 | Comoros | worker |
| CASENT0136656-D01 | BLF19846 | ASANO786-09 | GU709840 | 658 | Comoros | worker |
| CASENT0136764-D01 | BLF19700 | ASANO809-09 | GU709839 | 658 | Comoros | worker |
| CASENT0136784 | BLF18809 | ASIMB886-09 | OP442959 | 654 | Mayotte | worker |
| CASENT0136900-D01 | BLF20364 | ASANR766-09 | GU711159 | 658 | Madagascar | worker |
| CASENT0136902-D01 | BLF20384 | ASANP695-09 | GU710446 | 658 | Madagascar | queen |
| CASENT0136903-D01 | BLF20384 | ASANP696-09 | GU710445 | 645 | Madagascar | worker |
| CASENT0137058-D01 | BLF19947 | ASANO840-09 | GU709842 | 658 | Comoros | worker |
| CASENT0137059-D01 | BLF19947 | ASANO841-09 | GU709841 | 658 | Comoros | worker |
| CASENT0137334-D01 | BLF19951 | ASANO912-09 | GU709844 | 658 | Comoros | worker |
| CASENT0137487-D01 | BLF19767 | ASANO967-09 | GU709836 | 658 | Comoros | worker |
| CASENT0145999-D01 | BLF21147 | ASANQ049-09 | GU710903 | 658 | Comoros | worker |
| CASENT0146463-D01 | BLF21164 | ASANQ138-09 | GU710902 | 658 | Comoros | worker |
| CASENT0146468-D01 | BLF21187 | ASANQ140-09 | GU710905 | 658 | Comoros | worker |
| CASENT0146475-D01 | BLF21160 | ASANQ144-09 | GU710904 | 658 | Comoros | worker |
| CASENT0146479-D01 | BLF21176 | ASANQ146-09 | GU710907 | 658 | Comoros | worker |
| CASENT0146495-D01 | BLF21188 | ASANQ150-09 | GU710906 | 658 | Comoros | worker |
| CASENT0147204-D01 | BLF20835 | ASANQ268-09 | GU710909 | 658 | Comoros | worker |
| CASENT0189653 | BLF18804 | ASIMB946-09 | OP442955 | 654 | Mayotte | worker |
| CASENT0189654 | BLF18810 | ASIMB947-09 | OP442960 | 654 | Mayotte | worker |
| CASENT0788835-D01 | BLF40204 | BFANT381-22 | OP442958 | 658 | Madagascar | male |

## Taxonomic synopsis

### *Erromyrma latinodis* (Mayr, 1872)

*Monomorium latinode* Mayr, 1872: 152 (w.). Lectotype worker (designated by Heterick 2006: 108): Malaysia ("Borneo"), Sarawak, 1865–66 (J. Doria & O. Beccari), unique specimen identifier: CASENT0010941, examined [BMNH]. Paralectotype with same data as lectotype, unique specimen identifier: CASENT0905756, examined [MSNG]. [Combination in *Erromyrma*: Fisher and Bolton 2016: 276].

*Monomorium latinode* var. *bruneum* Emery, 1893: 243 (w.). Lectotype worker (designated by Heterick 2006: 108): Sri Lanka ("Ceylon"), Kandy, i.–ii.1892 (E. Simon), unique specimen identifier: CASENT0008632, examined [MSNG]. [Junior synonym of *latinode*: Heterick 2006: 108].

*Monomorium latinode* var. *voeltzkowi* Forel, 1907: 78 (w.). Lectotype worker (designated by Heterick 2006: 108): Tanzania ("Ostafrika"), Pemba I., Chake-Chake (A. Voeltzkow) [MCZC]. Paralectotype with same data as lectotype, unique specimen identifier: CASENT0101928, examined [MHNG]. [Junior synonym of *latinodis*: Bolton 1987: 429].

*Monomorium latinodoides* Wheeler, 1928: 17 (w.). Syntype worker: China: Hong Kong, Kowloon (F. Silvestri) unique specimen identifier: MCZ-ENT00727982, examined [MCZC]. comb nov., syn. n.

**Note.** The type series at MCZ was examined. The syntypes series are labeled "Kowloon" (F. Silvestri): one pin with 3 workers (MCZ-ENT00020883) and 2 workers and one dealate queen on a second pin (MCZ-ENT00727982). The workers match the description and diagnosis (see below) of worker of *E. latinodis*. We formally combine the species in *Erromyrma* and synonymize the species with *E. latinodis*. However, we exclude the queen (on MCZ-ENT00727982) from the syntype series; it belongs to the genus *Carebara* (Westwood, 1840).

**Diagnosis. *Erromyrma* workers [modified from Heterick (2006) and Fisher and Bolton (2016)]:**

1. Worker caste polymorphic
2. Palp formula 3,3
3. Mandible triangular, smooth, and shiny
4. Five mandibular teeth
5. Antenna with 12 segments, with 3-segmented apical club
6. Scape short, failing to reach occipital margin
7. Compound eyes present and conspicuous
8. Clypeus with a distinct unpaired seta at the midpoint of the anterior margin
9. Frontal carinae short and parallel
10. Antennal scrobe absent
11. Head without raised nuchal (= occipital) carina

12. Tibial spurs absent from meso- and metatibia
13. Promesonotal suture not distinct in dorsal view
14. Metanotal groove present
15. Propodeum unarmed
16. Propodeal dorsum with strong transverse striolae
17. Petiole pedunculated
18. Subpetiolar process absent
19. Sting developed

***Erromyrma latinodis* males:**
The following combination of characters diagnose males of *Erromyrma latinodis*.

1. Palp formula 5,3
2. Mandible triangular with distinct basal and masticatory margins (Fig. 2B)
3. Four mandibular teeth (Fig. 2B)
4. Antenna short and filiform, with 13 segments; pedicel subglobular (Fig. 2B)
5. Scape short (SI < 33, Fig. 2B)
6. Compound eyes large (EL/HW1 0.58, Fig. 1A)
7. Ocelli present and similar in size (Fig. 1A)
8. Clypeus with anterior margin convex. (Fig. 2B)
9. Frontal carinae absent (Fig. 2B)
10. Antennal scrobe absent (Fig. 2B)
11. Head without raised nuchal (= occipital) carina (Fig. 2C)
12. Notauli absent (Fig. 2C)
13. Single spur present on meso- and metatibia (Fig. 2A)
14. Pterostigma present on the forewing (Fig. 3)
15. First median-cubital cross-vein (1m-cu) present on the forewing (Fig. 3)
16. Cubital vein of the forewing fused with the median vein (M+Cu) and forms an angle higher than 45° with M (Fig. 3)
17. Forewing cross-vein 2rs-m absent (Fig. 3)
18. Petiole pedunculate (Fig. 2A)
19. Postpetiole elongated anteriorly, subglobose in lateral view (Fig. 2A)
20. Abdominal segment IV elongate and not shouldered (Fig. 2A)
21. Pygostyles present (Fig. 2A)

Male measurements (*N* = 2). HL 0.60–0.62, HW1 0.48–0.5, HW2 0.62–0.65, EL 0.28–0.29, EW 0.21–0.23, IOD 0.20–0.21, LOD 0.06–0.07, OOD 0.16–0.18, SL 0.12–0.14, F1 0.09–0.10, PL 0.51–0.54, PW 0.20–0.21, PPW 0.33–0.34, CI 81–82, SI 28, EI 0.58.

**Description. *Erromyrma latinodis* males:**

***Structure.*** In full-face view, the head including compound eyes slightly wider than long. Posterior head margin relatively rounded; head with three large, rounded ocelli of the same size, situated on the frontal face of the head, lateral ocelli directed 45° toward lateral sides. Compound eye large, strongly bulging. Anterior margin of clypeus

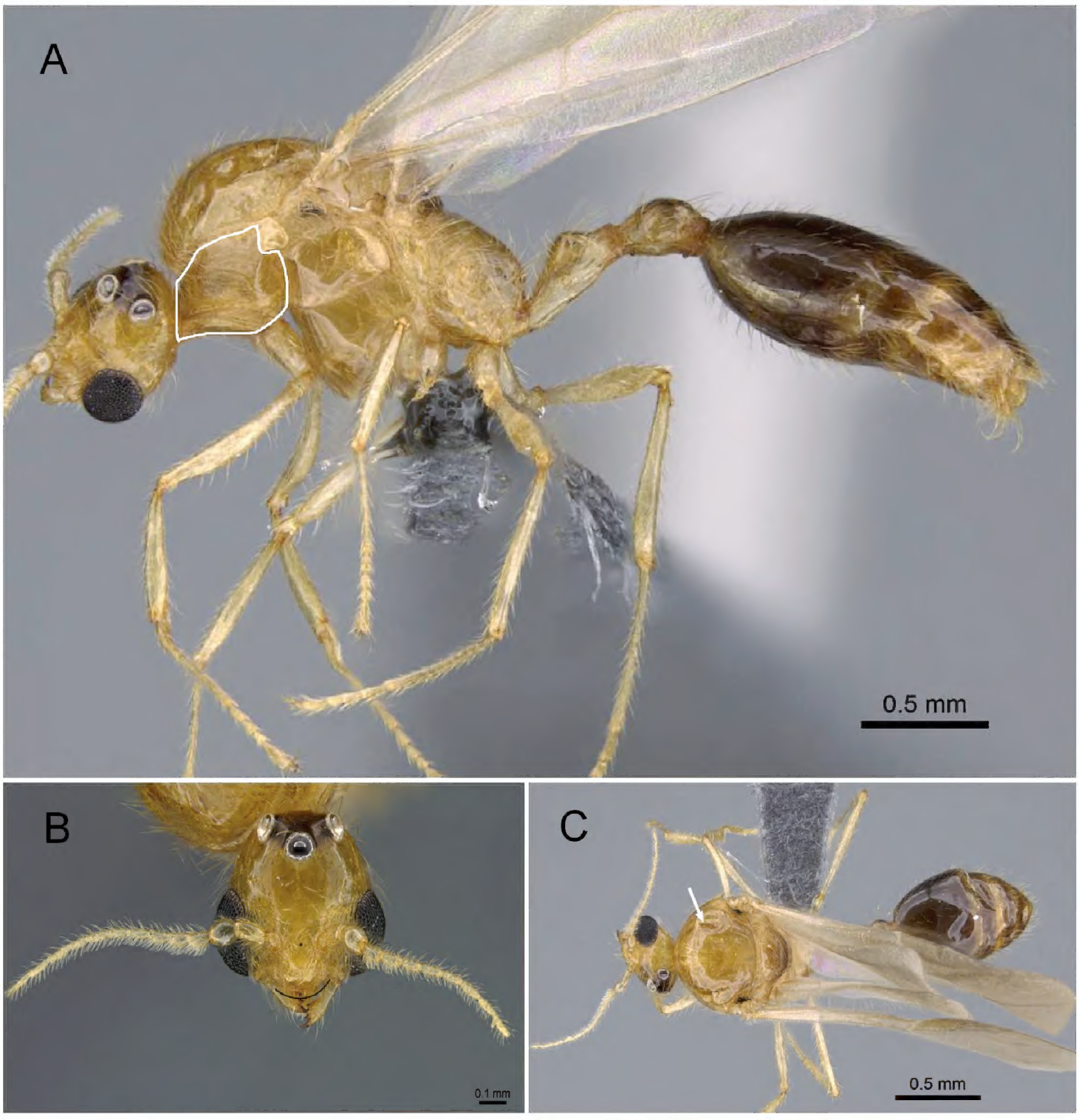


**Figure 2.** *Erromyrma latinodis* (CASENT0788835) **A** body in lateral view **B** head in full-face view **C** body in dorsal view.

convex. Mandible well developed and elongate triangular; masticatory margin with four teeth, the basal and masticatory margins are distinct.

Antennae 13-segmented short and filiform, pedicel subglobular. The mesoscutum is strongly convex and bulging, in the dorsal view much broader than the head at the level of the forewing insertion. In dorsal view, pronotum short in the median portion; notauli absent on the mesoscutum; mesoscutellum broader than long and smaller than mesoscutum. Metapleural gland bulla present with metapleural lobe closed. In profile, propodeal angle rounded, without spines or teeth. Hind femora longer than tibia.

In lateral view, petiole distinctly pedunculated; subpetiolar process absent (Fig. 2A). In dorsal view, abdominal segment III (postpetiole) elongated anteriorly; abdominal segment IV not shoulder and broader than the remaining tergites.

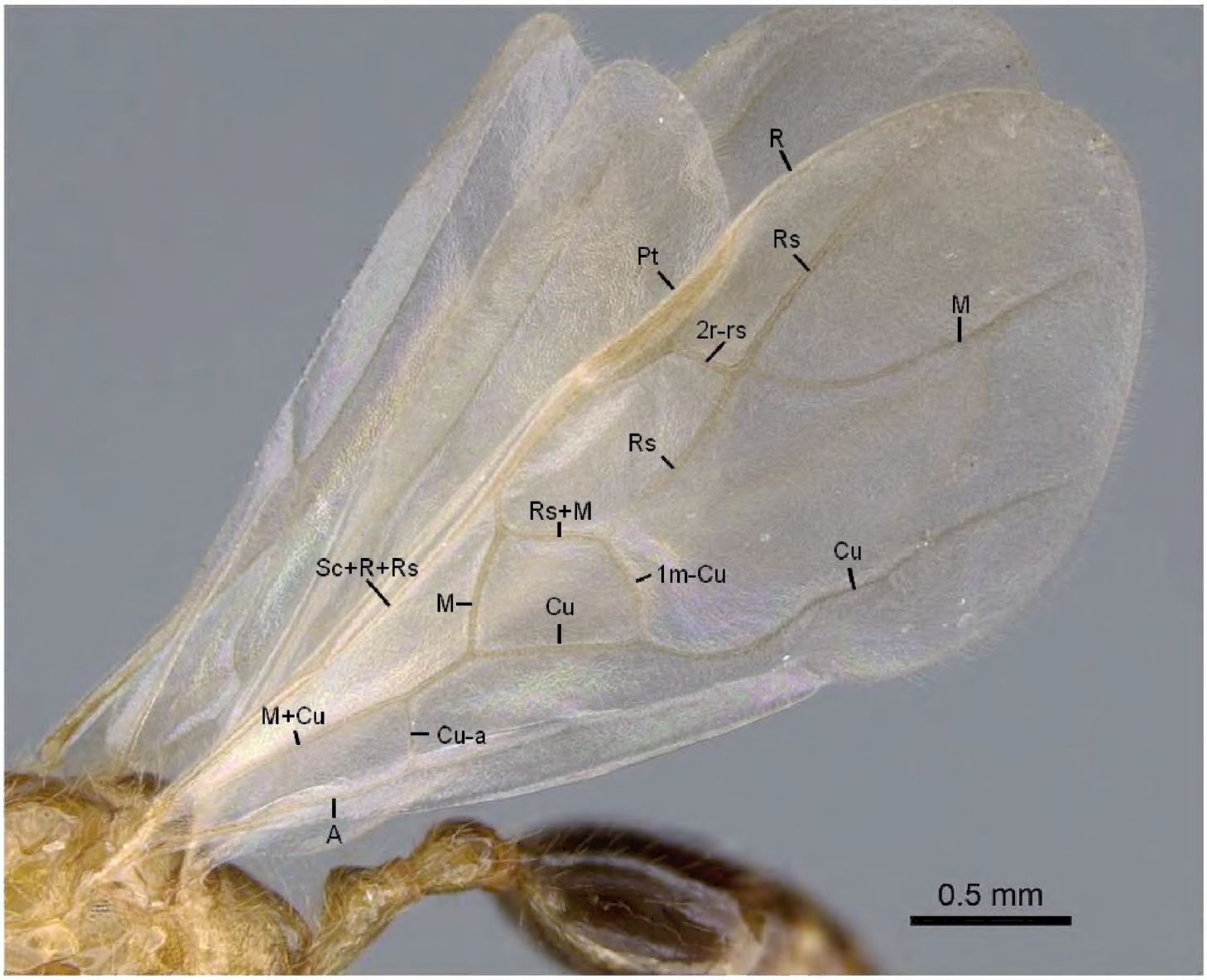


**Figure 3.** Male forewing veins of *Erromyrma latinodis* (CASENT0788835). Abbreviations: **Pt** pterostigma; **Sc** subcosta; **R**, **r** radius; **Rs**, **rs** radial sector; **M**, **m** media; **Cu** cubitus; **A**, **a**, anal.

***Sculpture.*** Clypeus, dorsum, lateral face, and venter of head weakly smooth and shiny. Pro- and mesothorax extensively smooth or very superficially sculptured and shiny, with posterolateral area of mesoscutum and posterior zone of mesopleuron unsculptured with shiny area. Metanotum and metapleuron unsculptured and matte. Apical area of anterior slope of petiole, coxae, femora, and tibiae of all legs smooth to superficially sculptured and shiny; tarsi entirely microsculptured. Gaster (abdominal segments IV to the apex) entirely smooth to superficially sculptured and shiny.

***Color.*** Body and mandible largely brownish yellow except the ocellar region and the abdominal segments IV to the apex, brown.

***Pilosity.*** Anterior margin of clypeus with a pair of stout setae and without a distinct unpaired seta at its midpoint. Mandible covered with standing hairs. Antennal scape and pedicel with short and decumbent whitish hairs; the flagellomeres densely hairy. Hairs on head and body moderately abundant, erect, short, and stout. Pronotum, mesoscutum, and mesoscutellum with many obliquely standing hairs; hairs on mesopleuron much sparser; metanotum and propodeum with erect hair. Femora and tibiae with appressed hairs; tarsi covered with short appressed hairs. Posterior margins of each abdominal tergite and sternite with long and suberect hairs. Parameres covered with stout hair.

***Wings.*** (Fig. 3) Forewing with four closed cells. Costal vein (C) absent. Pterostigma pigmented, visible on the leading edge of the forewing. Radial vein (R) fused proximally to constitute Sc+R+Rs before reaching the pterostigma.

Radial sector (Rs). Past the separation from Sc+R+Rs, Rs usually short free abscissa down curved and never reaching to the costal margin, the radial sector connects to the pterostigma via the second radial-radial sector cross-vein (2r-rs). Then merging with median vein (M) and continuing fused (Rs+M).

Median vein (M). Further away from the leading wing margin is the median vein, proximally fused with cubital vein (M+Cu), following separation continuing as a free abscissa M before joining with radial sector to form Rs+M. Median vein (M) is fused with radial sector and present in past the junction of the radial sector.

Cubital vein (Cu). Proximally the cubital vein is fused with median vein (M+Cu), the cubital vein (Cu) divided by median-cubital cross-vein (1m-cu) the cubital vein does not connect to the distal wing margin.

Anal vein (A). A longitudinal vein running near the posterior wing margin. Consists of a free abscissa fused to cubital-anal cross-vein (cu-a), and continuing past cu-a.

**Comments.** The tribe Solenopsidini is separated from other Malagasy myrmicine tribes by the following combination of characters: with the head in full-face view, mandibles with masticatory margin less than five teeth; antennal scrobe reduced to absent; pedicel not more elongated than the remaining segments; ocelli present and same size situated on the frontal face of the head, lateral ocelli directed toward oblique front sides; occipital carina not visible in full-face view; head (including compound eyes) slightly wider than long with occipital margin of head rounded. In lateral view, the anterodorsal margin of mesopleuron lower than the highest point of the wing process, pronotum and mesonotum from a smooth convexity, pronotal furrow less marked; forewing venation: cross-vein 2rs-m absent, costal vein absent, radial sector down curved and never reaching to the costal margin; propodeal spines absent; pygostyle present; abdominal segment III attached anteriorly to abdominal segment IV; peduncle of abdominal segment III is distinctly longer than that of the petiole; single tibial spur present on the front leg. In dorsal view, notauli absent.

*Erromyrma* can be distinguished from three other genera, *Adelomyrmex* (Emery, 1897), *Monomorium* (Mayr, 1855) and *Syllophopsis* (Santschi, 1915), by its subglobular pedicels. It can be separated from the genus *Solenopsis* (Westwood, 1840) by the number of its antennal segment.

## Key to the tribes of subfamily Myrmicinae based on males in the Malagasy region

The subfamily of Myrmicinae is represented by four tribes in the Malagasy region: Attini, Crematogastrini, Solenopsidini, Stenammini.

**Attini:** *Cyphomyrmex* (introduced), *Eurhopalothrix*, *Pheidole*, *Pilotrochus*, *Strumigenys*.

**Crematogastrini:** *Calyptomyrmex*, *Cardiocondyla*, *Carebara*, *Cataulacus*, *Crematogaster*, *Dicroaspis*, *Eutetramorium*, *Malagidris*, *Melissotarsus*, *Meranoplus*, *Metapone*,

*Nesomyrmex*, *Pristomyrmex*, *Royidris*, *Teratanер*, *Tetramorium*, *Trichomyrmex*, *Vitsika*, *Vollenhovia* (introduced?).

**Solenopsidini:** *Adelomyrmex*, *Erromyrma* (introduced), *Monomorium*, *Solenopsis*, *Syllophopsis*.

**Stenammini:** *Aphaenogaster*.

1 In profile, occipital carina strongly developed (Fig. 4A); mesoscutellum strongly elevated above metanotum; in dorsal view, scutellum smooth and convex (Fig. 4C); petiole distinctly pedunculate. With the head in full-face view, mandible always triangular..... **Stenammini (*Aphaenogaster*)**

– In profile, occipital carina not forming a sharp ridge (Fig. 4B); mesoscutellum slightly convex to flat; in dorsal view, scutellum with or without sculptured (Fig. 4D); petiole sessile to shortly pedunculate. With the head in full-face view, the mandible broadly triangular to reduce..... **2**

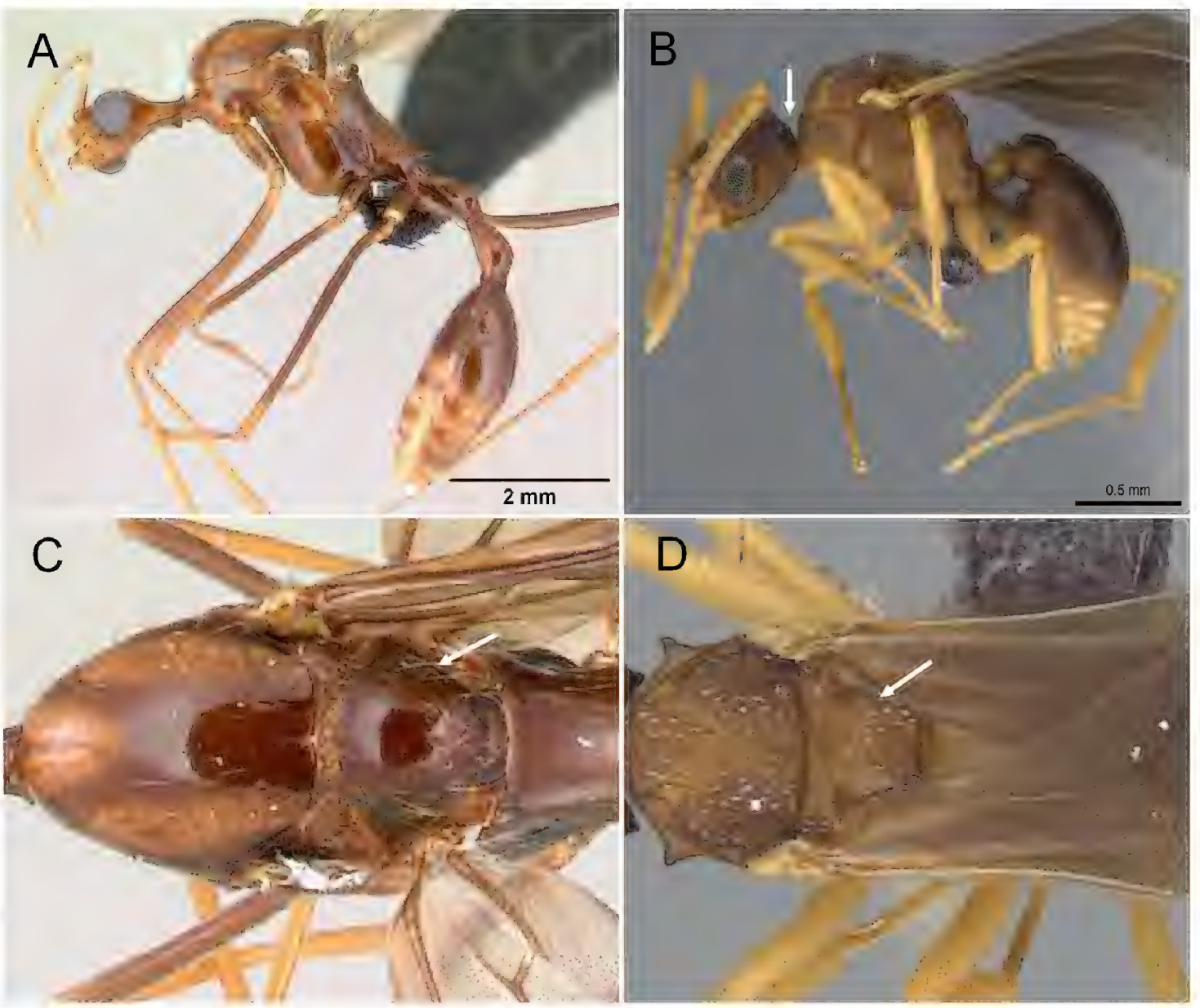


**Figure 4.** In profile view showing occipital carina **A, B** *Aphaenogaster bressleri* (CASENT0495103). In dorsal view form mesoscutellum **C, D** *Cyphomyrmex minitus* (CASENT0264488).

2 In profile, posterodorsal margin of head almost straight from the base of the lateral ocelli to the midpoint of the occipital carina. (Fig. 5A) ..... **Attini (part)**

– In profile, posterodorsal margin of head gradually rounded from the base of the lateral ocelli to the midpoint of the occipital margin. (Fig. 5B) ..... **3**

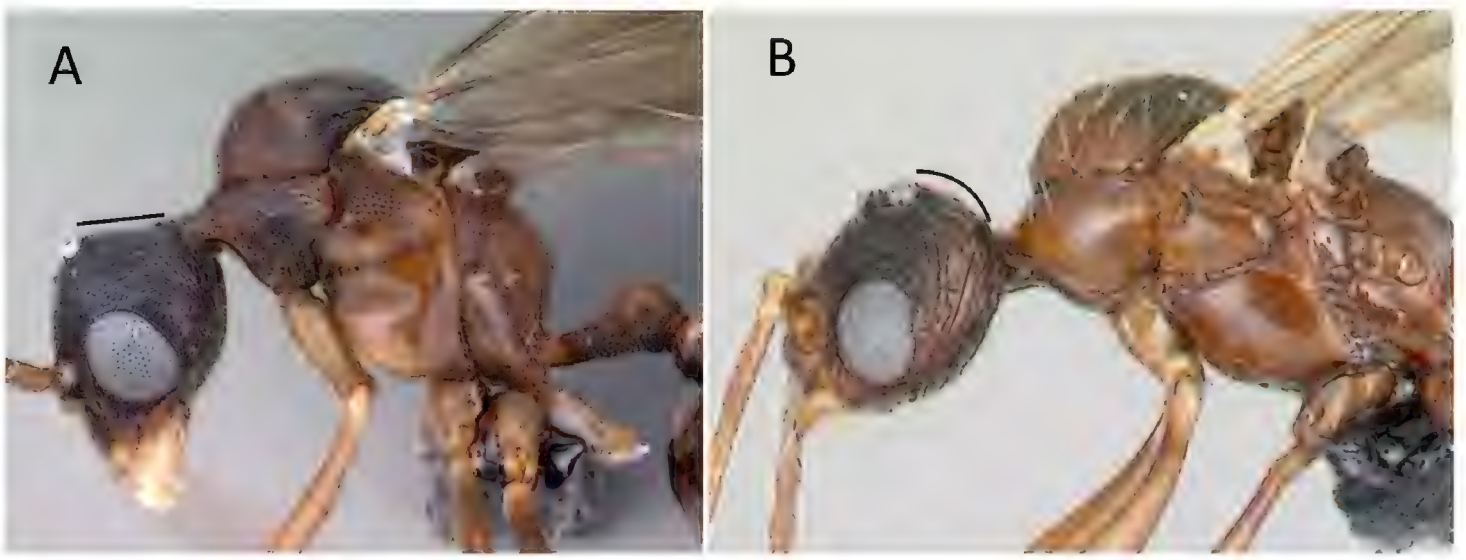


**Figure 5.** Head in profile view **A** *Strumigenys chilo* (CASENT0145240) **B** *Tetramorium silvicola* (CASENT0494732).

3 Cross-vein 2rs-m present on forewing (Fig. 6A) ..... **(Attini) *Pheidole***

– Cross-vein 2rs-m absent on forewing (Fig. 6B) ..... **4**

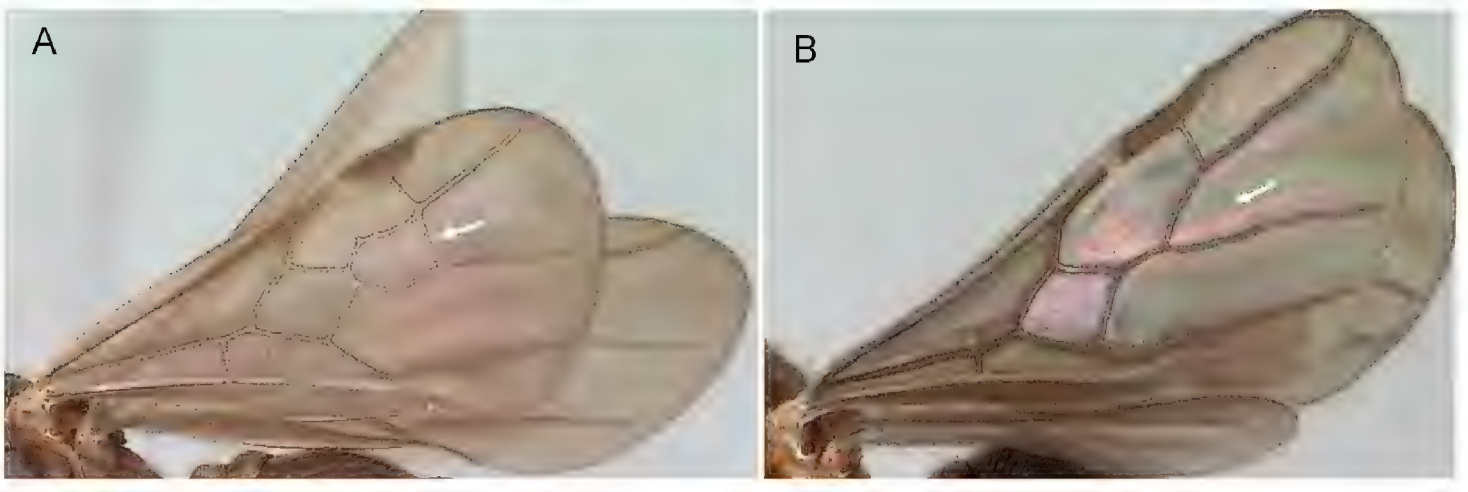


**Figure 6.** Forewing **A** *Pheidole* mgs006 (CASENT0135889) **B** *Carebara* drm03 (CASENT0143975).

4 Mandible strongly developed; masticatory margin with 7 large teeth which increase in size from apex to base; between each tooth is a minute denticle (Fig. 7A) ..... **(Attini) *Pilotrochus***

– Mandible normal to reduced; edentate to multidentate with many acute teeth which decrease in size from apex to base; without denticle between the teeth (Fig. 7B) ..... **5**

**Figure 7.** Mandible **A** *Pilotrochus besmerus* (CASENT0057183) **B** *Malagidris sofina* (CASENT0906626).

5 In lateral view, anterior margin of promesonotum forms a continuous outline, pronotal furrow not breaking outline (Fig. 8A) ..... **Solenopsidini**

– In lateral view, anterior margin of promesonotum interrupted by an impressed pronotal furrow that breaks the outline (Fig. 8B) or mesonotum strongly produced anterodorsally (Fig. 8C)..... **Crematogastrinii**

**Figure 8.** In profile view **A** *Monomorium termitobium* (CASENT0135952) **B** *Meranoplus mayri* (CASENT0062813) **C** *Crematogaster hazolava* (CASENT0317643).

## Male-based key to genera of the tribe Solenopsidini in the Malagasy region

1 Antennae 12-segmented..... ***Solenopsis***

– Antennae 13-segmented.....**2**

2 In full-face view, pedicel subglobular; posteromedian margin of clypeus effaced so that clypeus and frons form a continuous surface (Fig. 9A); mandible triangular with distinct basal angle, masticatory margin with exactly 4 teeth .....***Erromyrma***

– In full-face view, pedicel not globular, more cylindrical; posteromedian margin of clypeus visible (Fig. 9B); mandible spatulate to triangular, but its basal angle always indistinct, masticatory margin with 1 to 4 teeth.....**3**

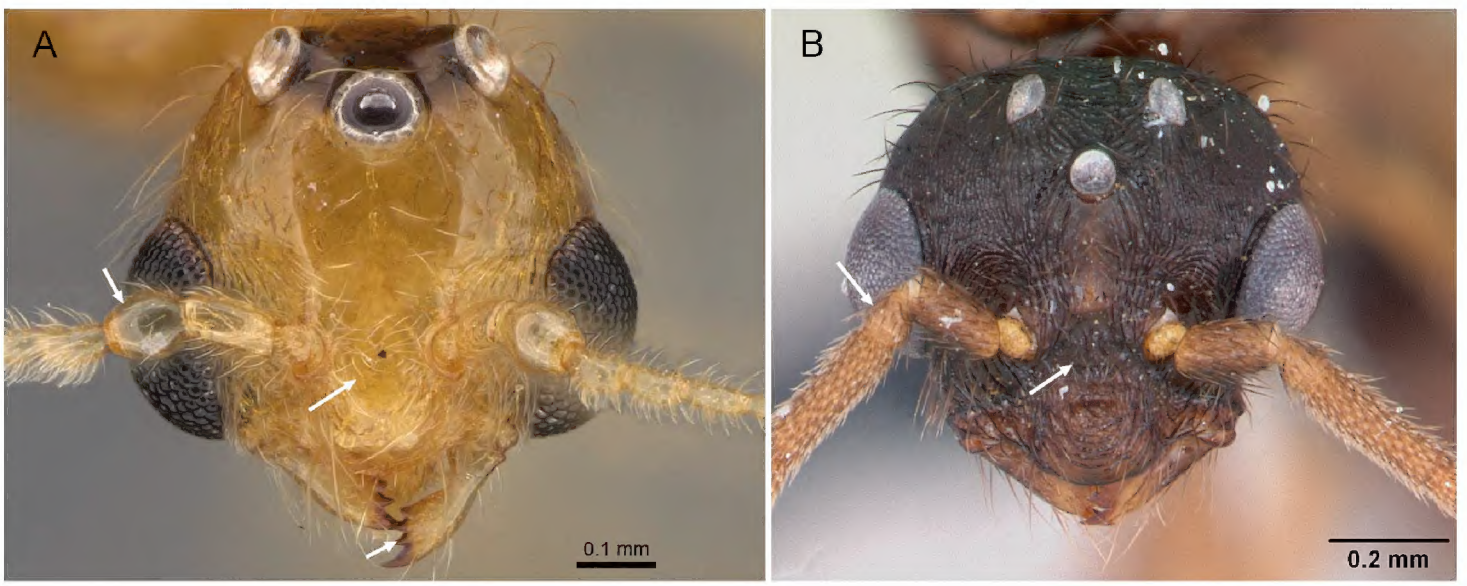


**Figure 9.** Head in full-face view showing the pedicel, mandible, postero-median margin of clypeus **A** *Erromyrma latinodis* (CASENT0788835) **B** *Syllophopsis cryptobia* (CASENT0103340).

3 Forewing with five closed cells, 1m–cu cross-vein present (Fig. 10A). In profile, petiolar peduncle longer than postpetiolar length (Fig. 10C)..... ..... ***Syllophopsis***

– Forewing with four closed cells, 1m–cu cross-vein absent (Fig. 10B). In profile, petiolar peduncle absent or shorter than postpetiolar length (Fig. 10D).....**4**

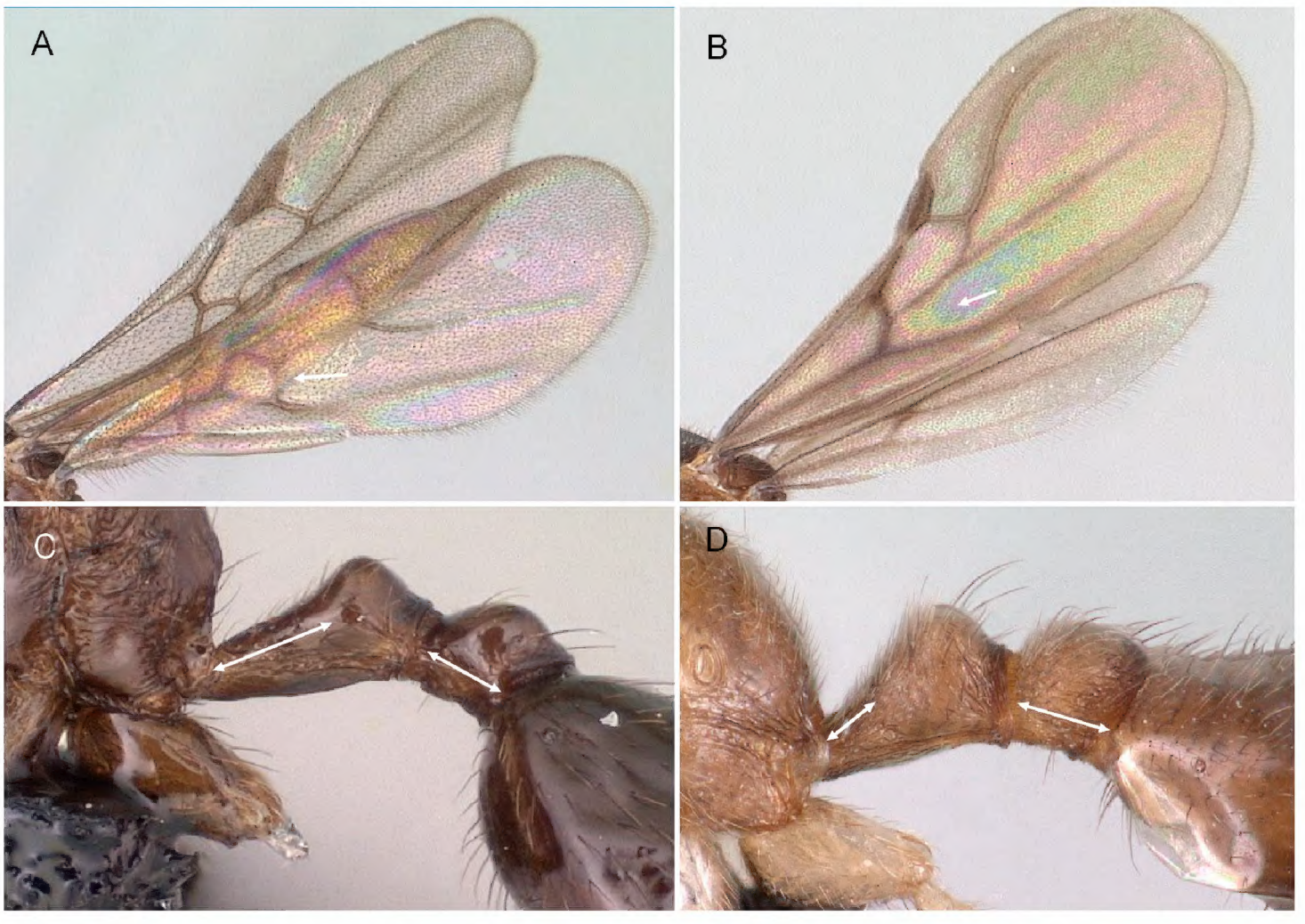


**Figure 10.** In profile view showing forewing, petiole and post petiole **A, C** *Syllophopsis modesta* (CASENT0135642) **B** *Monomorium termitobium* (CASENT0135673) **D** *Monomorium termitobium* (CASENT0135952).

4 With the head in full-face view, antennal scape short, barely reaching the posterior ocular margin; mandible long, curved, masticatory margin with 3 to 4 teeth (Fig. 11A) .....***Monomorium***

– With the head in full-face view, antennal scape long reaching the occipital margin; mandible short, spatulate, basal margin linear, unidentate (Fig. 11B) .....***Adelomyrmex* (Seychelles)**

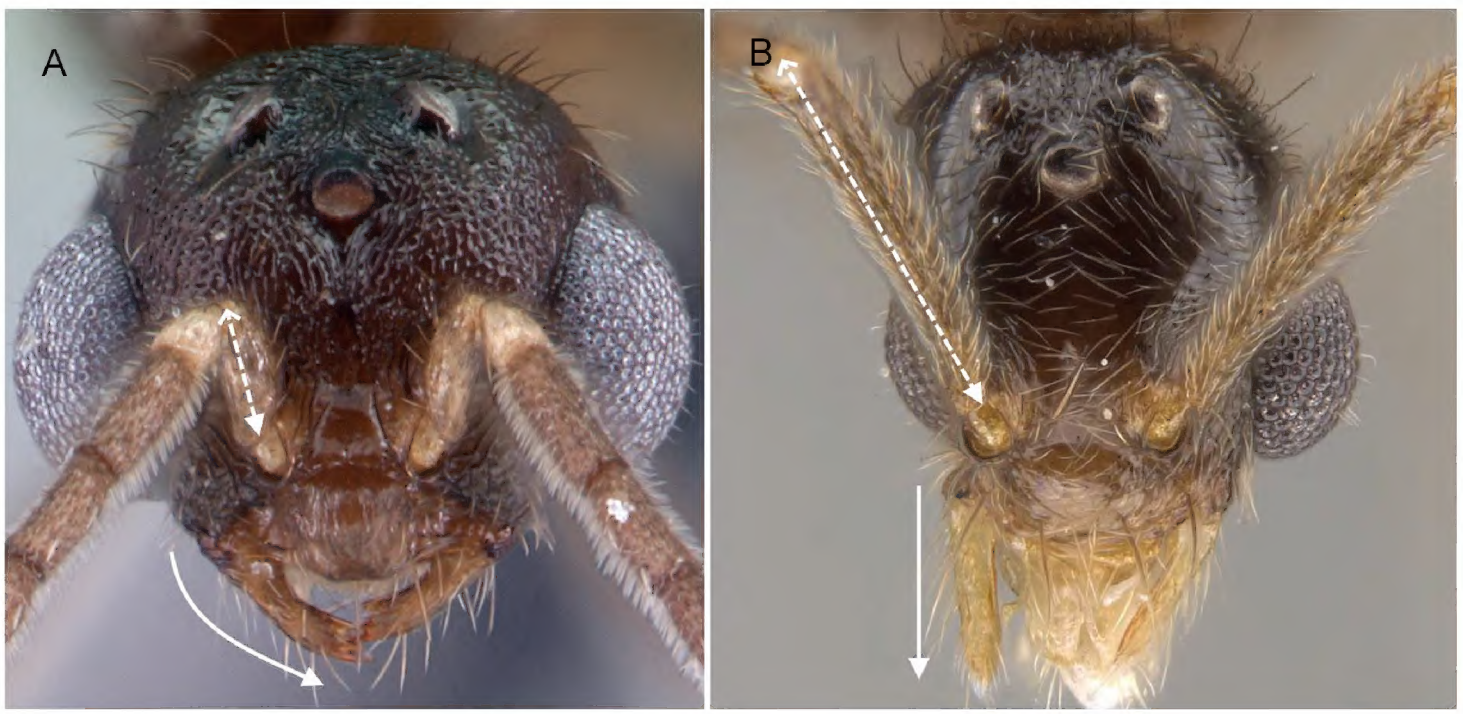


**Figure 11.** Head in full-face view showing mandible and scape **A** *Monomorium exiguum* (CASENT0135614) **B** *Adelomyrmex* sc01 (CASENT0160764).

## Discussion

In the Malagasy region, *Erromyrma latinodis* was collected from Comoros, Madagascar and Mayotte (see Fig. 12). The species inhabits montane rainforest, mangrove, *Uapaca* woodland, dry forest, and anthropogenic habitats from elevations of 2 to 1726 m. Workers were collected from a range of microhabitats and methods including foraging on low vegetation, on the ground, in ground nests, sifted litter, under stones, rotten wood or from dead twigs above ground. The males were collected along with workers and queens under the bark on the main trunk of a mango tree along a village road.

The males for this species were only collected after six expeditions. They are not collected by traditional means for example: malaise traps sampling or UV light samples from the region. Initial expeditions to known localities in northern Madagascar did not find the males. Colonies were kept alive for over a year without the production of males. Two males were finally found at one of the known collection sites.

The C01 data confirms the identification of the males and also shows a pattern of 0% sequence divergence between the samples from Madagascar, Comoros, and Mayotte. The lack of sequence divergence across island systems supports the hypothesis that this species is introduced in the region. Low sequence diversity could also be explained by other factors such as reproductive systems. The difficulty of finding males could be linked to a reproductive system that would reduce sequence divergence.

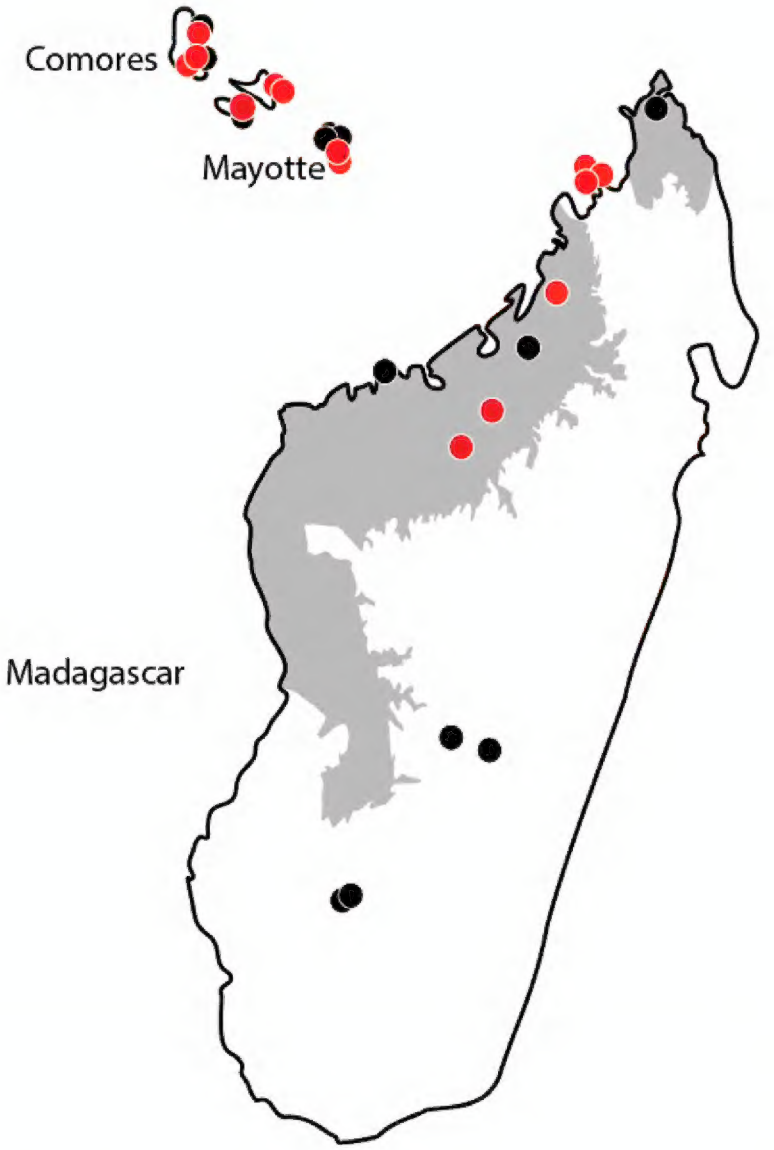


**Figure 12.** Distribution of *Erromyrma latinodis* in the Malagasy region. Red indicates localities of sequenced specimens.

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